

B3
cont.

Claim 10 (New). A process according to claim 1 or 9, wherein M^+ is K^+ .

REMARKS

Claims 1-8 were rejected. Claims 1, 2, 3, 4, 7 and 8 are amended and new claims 9 and 10 added. Support for the amendments and new claims can be found throughout the application, for instance in the claims as originally filed. No new matter is added. Claims 1-10 are submitted for consideration at this time. Applicants respectfully request reconsideration and withdrawal of all rejections.

Claim Rejections - 35 U.S.C. § 112, Second Paragraph

Claims 1-8 were rejected as being indefinite. Regarding the term "salified" as found in claim 1, Applicants point out that those of ordinary skill in the art would understand this term to indicate that the fluorinated surfactant has salifying groups such as carboxylic -COOH or sulphonic -SO₃H and said groups are salified with sodium or potassium. Applicants also note with respect to the (per)fluoroalkyl and (per)fluoropolyoxyalkylene chains of claim 2 that the aqueous microemulsions as claimed are formed by (per)fluoropolyoxyalkylene, water and a fluorinated surfactant. The fluorinated surfactant, used for stabilizing the microemulsion, is a compound different from the (per)fluoropolyoxyalkylene of the microemulsion since it is a Na or K salt of a carboxylic or sulphonic derivative of a (per)fluoropolyoxyalkylene or (per)fluoroalkyl. Finally, it is respectfully pointed out that the remaining aspects of the rejection are moot in light of the amendments indicated herein. Applicants urge that all claims are clear and definite.

Claim Rejections - 35 U.S.C. §102

Claims 1-7 were rejected under 35 U.S.C. §102(b) as being anticipated by Abusleme et al. (U.S. Patent No. 5,498,680) (hereinafter "Abusleme I"). It is alleged that Abusleme I discloses a process of synthesizing chlorotrifluoroethylene homopolymer or copolymer wherein the process is conducted in (per)fluoropolyoxyalkylene microemulsion which comprises (per)fluoropolyoxyalkylene surfactant in the presence of alkali metal persulfate initiator.

Applicants respectfully disagree. Applicants point out that the present invention is directed to a process for the synthesis of chlorotrifluoroethylene (PCTFE) (co)polymers, containing at least 80% by moles of CTFE, the complement to 100 being one or more fluorinated monomers, in the presence of a reaction medium, a fluorinated surfactant and an initiator. The process is characterized in that the reaction medium comprises (per)fluoropolyoxyalkylene microemulsions wherein the fluorinated surfactant is salified with sodium and/or potassium and potassium and/or sodium persulphate as inorganic initiator, wherein the temperature is in the range of 0°C - 150°C and the pressure is in the range of 3 - 80 bar.

That is, the present invention relates to a polymerization process for obtaining a CTFE (co)polymer endowed with thermal stability, which shows no discoloration and a reduced weight loss at high working temperature, by operating in the presence of a (per)fluoropolyoxyalkylene microemulsion whose surfactant may be sodium and/or potassium salt of a carboxylic or sulphonic derivative of (per)fluoropolyoxyalkylene or (per)fluoroalkyl and a potassium and/or sodium persulphate inorganic initiator. No such invention is taught or suggested in the prior art.

In contrast to the present invention, the Abusleme I reference discloses a polymerization process of one or more fluorinated olefinic monomers, optionally with non-fluorinated olefins, in the presence of a microemulsion of fluoropolyoxyalkylenes, a fluorinated surfactant and an initiator. For instance, in working Examples 1 and 3 the reference discloses the polymerization of ethylene/tetrafluoroethylene (E/TFE) in fluoropolyoxyalkylene microemulsion, in the presence of fluorinated surfactant and ammonium persulphate initiator. However, Applicants respectfully point out that the Abusleme I reference contains no teaching or suggestion with respect to the polymerization of CTFE as required by the present invention. Abusleme I contains absolutely no teaching or suggestion regarding the polymerization of CTFE, optionally with other fluorinated monomers, in the presence of a (per)fluoropolyoxyalkylene microemulsion and sodium or potassium as claimed. The Abusleme I reference simply fails to teach or suggest each and every element of the present invention. Applicants respectfully request withdrawal of the rejection.

Applicants would also like to point out that Abusleme I discloses as initiators the inorganic peroxides or azo compounds or inorganic/organic redox systems (paragraph bridging cols. 4 and 5). Ammonium sulphate is shown Examples 1 and 3. However, as can be seen from Comparative Example 5, Applicants have studied ammonium persulphate as an initiator. In comparison to Example 1 according to the present invention, it can be clearly seen that in using ammonium persulphate the cited references are unable to obtain a CTFE showing no discoloration and a reduced weight loss without having residues on the wall of the reactor (no polymer buildup in the reactor). Accordingly, the present invention is also able to provide for unexpected results not taught or suggested by

any cited reference.

Claims 1-6 were rejected under 35 U.S.C. §102(e) as being anticipated by Abusleme et al. (U.S. Patent No. 6,096,795) (hereinafter "Abusleme II"). It is alleged that Abusleme II discloses a process of synthesizing chlorotrifluoroethylene homopolymer or copolymer by polymerizing chlorotrifluoroethylene in a microemulsion comprising (per)fluoropolyoxyalkylene surfactant and fluorinated liquid in the presence of sodium or potassium persulfate initiator.

Applicants respectfully disagree. Abusleme II discloses a photopolymerization process of one or more fluorinated olefinic monomers, in aqueous emulsion, optionally containing (per)fluoropolyoxyalkylene microemulsion, in the presence of fluorinated surfactant, and a photoinitiator, by using UV-visible radiation having a wavelength from 240 to 600 nm. The photoinitiator may be an inorganic peroxide such as potassium or ammonium persulphate, organic peroxides, di- or poly-ketones, transition metal complexes, or halogenated or polyhalogenated organic compounds. Applicants point out that in working example 1 there is disclosed VDF polymerization in a (per)fluoropolyoxyalkylene microemulsion, in the presence of a fluorinated surfactant and potassium persulphate, using UV radiations obtained by high pressure mercury lamps. It is to be noted that the remaining examples are all performed under UV-radiations and do not (co)polymerize CTFE.

Applicants therefore point out that in the present invention the polymerization of fluorinated monomers is not by UV-visible radiation. That is, the present invention does not require the use of UV-visible radiation to perform the polymerization of fluorinated monomers. Clearly those of ordinary skill in the art viewing the cited reference would find no teaching or suggestion with respect to the process as claimed which does not include

the presence of UV-visible radiations. Applicants respectfully submit in particular that the Abusleme II reference does not teach or suggest the (co)polymerization of CTFE, optionally with other fluorinated monomers, in the presence of potassium or sodium persulphate and a fluorinated surfactant which is a salt of sodium or potassium, in the absence of UV radiation, in order to obtain a CTFE (co)polymer showing no discoloration and a reduced weight loss. Applicants urge that the cited reference does not teach or suggest the present invention, and therefore, requests withdrawal of the rejection.

Claim Rejections - 35 U.S.C. §103

Claims 1-6 and 8 were rejected under 35 U.S.C. §103(a) as being obvious over DeSimone et al. (U.S. Patent No. 5,672,667) in view of Abusleme I. It is alleged that it would have been obvious to use the (per)fluoropolyoxyalkylene surfactant of Abusleme I in the process of DeSimone et al. so that the microemulsion would be stable.

Applicants respectfully disagree. DeSimone et al. discloses a polymerization of hydrogenated or fluorinated monomers, in an aqueous emulsion, in the presence of CO₂ and a fluorinated surfactant, using an initiator selected from chloro/fluoro organic peroxides, or inorganic peroxides such as alkali metal persulphate or permanganate. As noted at page 8 of the Office Action, however, Applicants respectfully point out that DeSimone et al. contains no teaching or suggestion regarding the (per)fluoropolyoxyalkylene microemulsion of the present invention. Moreover, the process of the DeSimone et al. reference is characterized by the use of CO₂ which is not contemplated by the present invention. Applicants point out that even in view of the Abusleme I reference, which discloses the use of fluoropolyoxyalkylene microemulsion, those of ordinary skill in the art would have no motivation to combine the cited references so as to arrive at the present invention. Those of ordinary skill in the art would have no

motivation to combine the fluoropolyoxyalkylene microemulsion of Abusleme I with a process using CO₂ as disclosed by DeSimone et al. so as to arrive at the present invention. Those of ordinary skill in the art would find no teaching or suggestion in DeSimone et al. and/or Abusleme I regarding a process for the synthesis of chlorotrifluoroethylene (PCTFE) (co)polymers in the absence of CO₂ according to the present invention. Therefore, in that the cited references lack the requisite teaching or suggestion, Applicants respectfully request withdrawal of the rejection.

Claims 1-5 and 8 were rejected under 35 U.S.C. §103(a) as being obvious over Wu et al. (U.S. Patent No. 6,046,271) either alone, or, in view of Abusleme I. It is alleged that it would have been obvious to use the initiator of Abusleme I in the process of Wu et al.

Applicants respectfully disagree. Wu et al. discloses a polymerization process of fluorinated olefinic monomers, in a microemulsion of a perfluorinated hydrocarbons having up to 2 oxygen atoms, in the presence of a fluorinated surfactant and of an initiator selected from persulphates, organic peroxides, azo compounds and permanganate. However, Applicants respectfully urge that Wu et al. does not teach or suggest the (per)fluoropolyoxyalkylene microemulsion of the present invention. Applicants point out that Wu et al. discloses, as clearly seen in the working examples, in the presence of ammonium persulphate initiator and ammonium perfluorooctanoate surfactant, a microemulsion of perfluoro-2-butyltetrahydrofuran which is not the (per)fluoropolyoxyalkylene according to the present invention. Moreover, although the Abusleme I reference discloses (per)fluoropolyoxyalkylene emulsions, neither Abusleme I nor Wu et al. teaches or suggests any combination of sodium or potassium persulphate with a sodium or potassium salt of a fluorinated surfactant as required by the present


invention. Applicants emphasize that such a combination is essential in obtaining CTFE (co)polymers with unexpectedly improved properties according to the present invention. Accordingly, the Abusleme I reference is unable to cure the deficiencies of the Wu et al. reference. Therefore, in that the cited references are unable to teach or suggest each and every element of the present invention, Applicants respectfully request withdrawal of the rejection.

In view of the amendments and remarks above, Applicant submits that this application is in condition for allowance and requests reconsideration and favorable action thereon.

In the event this paper is not considered to be timely filed, Applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300, along with any other fees which may be required with respect to this application.

Respectfully submitted,

ARENT FOX KINTNER PLOTKIN & KAHN, PLLC



Hans J. Crosby
Attorney for Applicant
Registration No. 44,634

Customer No. 004372
1050 Connecticut Avenue, N.W., Suite 400
Washington, D.C. 20036-5339
Tel: (202) 857-6000
Fax: (202) 638-4810

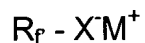
HJC:kga

Enclosures: Marked-Up Copy of Claim Amendments
Petition for Extension of Time

MARKED-UP COPY OF CLAIM AMENDMENTS

Claim 1 (Amended). A process for the synthesis of chlorotrifluoroethylene (PCTFE) (co)polymers, containing at least 80% by moles of CTFE, the complement to 100 being one or more fluorinated monomers, [preferably the complement to 100 is formed of one or more perfluorinated monomers,] in the presence of a reaction medium, a fluorinated surfactant and an initiator, characterized in that the reaction medium comprises (per)fluoropolyoxyalkylene microemulsions wherein the fluorinated surfactant is salified with sodium and/or potassium and [an inorganic] potassium and/or sodium persulphate as inorganic initiator, wherein temperature is in the range of 0°C - 150°C and pressure is in the range of 3 - 80 bar.

Claim 2 (Amended). A process according to claim 1 or 9, wherein the fluorinated surfactant is selected from the products of general formula



wherein R_f is a C_5-C_{14} (per)fluoroalkyl chain, or a (per)fluoropolyoxyalkylene chain, X^- is $-COO^-$ or $-SO_3^-$, and M^+ is [selected between] Na^+ [and] or K^+ .

Claim 3 (Amended). A [processo] process according to claim 2, wherein M^+ is [preferably] K^+ .

Claim 4 (Amended). A process according to claim 1, wherein [potassium] the inorganic initiators are [preferred] potassium inorganic initiators.

Claim 7 (Amended). A process according to claim [6] 1 or 9, wherein the temperature ranges between 10°C and 70°C and the pressure between 4 and 20 bar.

Claim 8 (Amended). A process according to claim [10] 1 or 9, wherein the [presence of liquid CTFE in the reaction medium is preferred] reaction medium comprises liquid CTFE.